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Sakatani et al.

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(54) **SEAT STAND AND WORKING MACHINE INCLUDING SAME**

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E02F 3/32	(2006.01)
E02F 9/22	(2006.01)

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(58) **Field of Classification Search**

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USPC 180/89.12; 296/190.08
See application file for complete search history.

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(57) **ABSTRACT**

A seat stand includes a seat support section including an installation plate portion having an upper surface on which a seat is provided and an left control box support section extending from a seat support section to the left side of the seat and supporting a left control box. The left control box support section includes an extension portion extending sideward from the installation plate portion and including an upper surface on which the left control box is supported. A arranging space is provided under the extension portion in such a manner that a connection line extending from the left control box supported on the extension portion is arranged through the arranging space. A cutout portion, formed in the extension portion, penetrates the extension portion in a vertical direction and is open sideward.

12 Claims, 7 Drawing Sheets

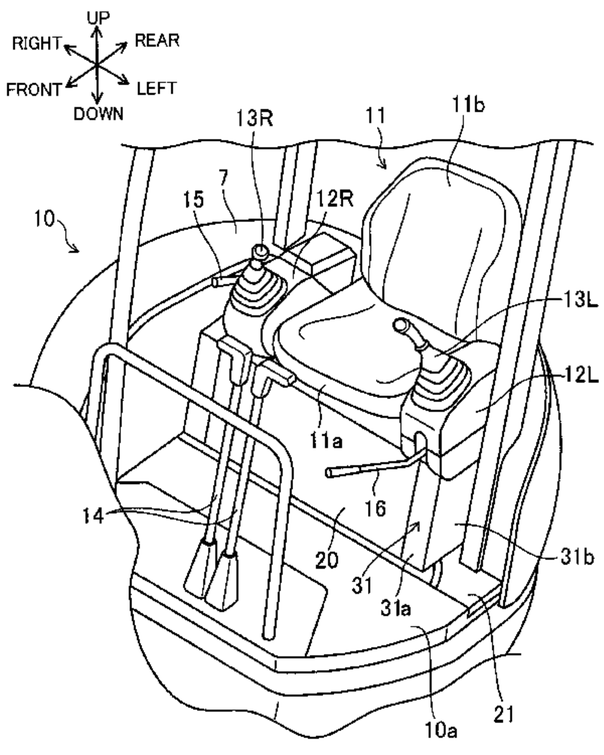

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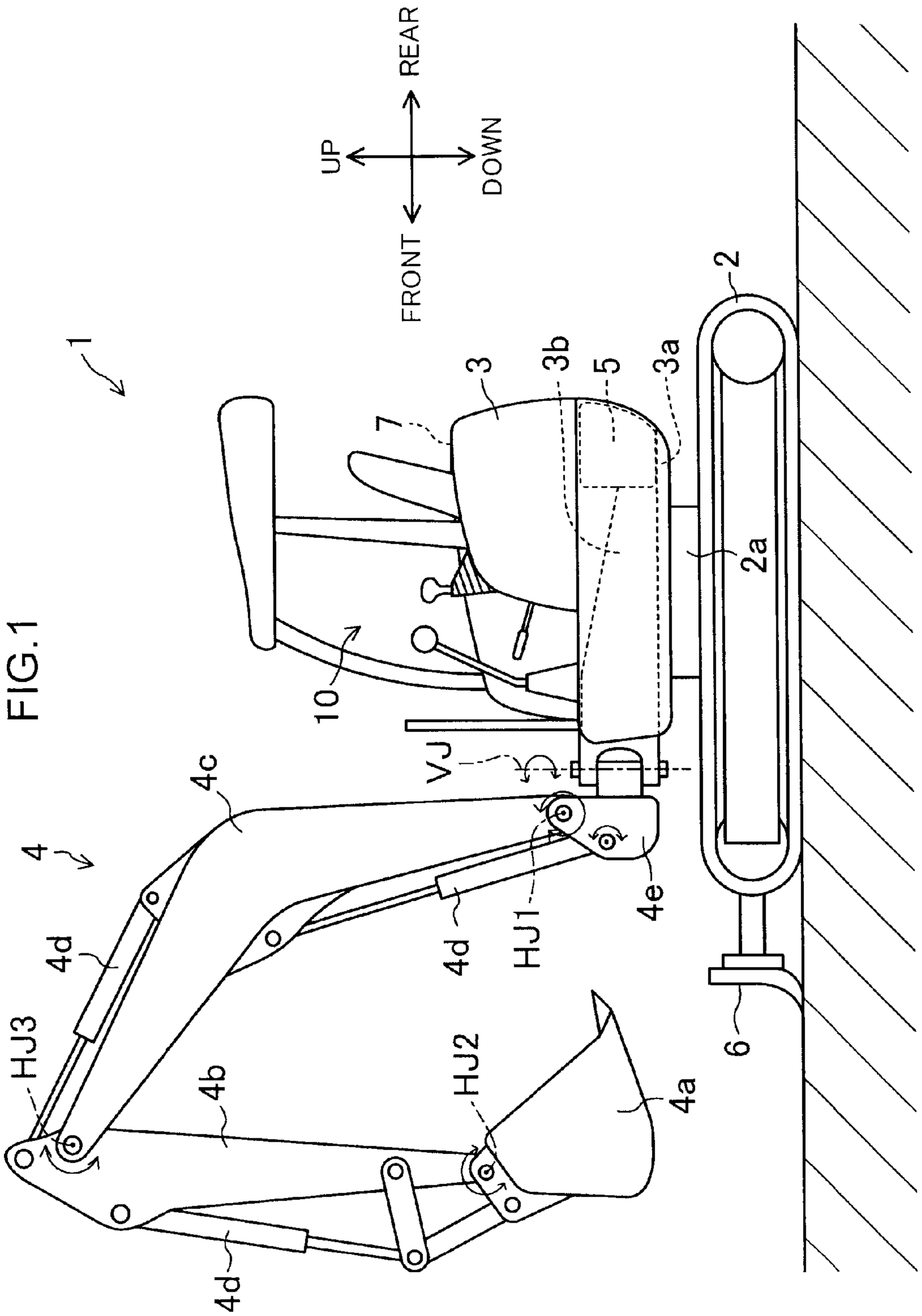
FIG.1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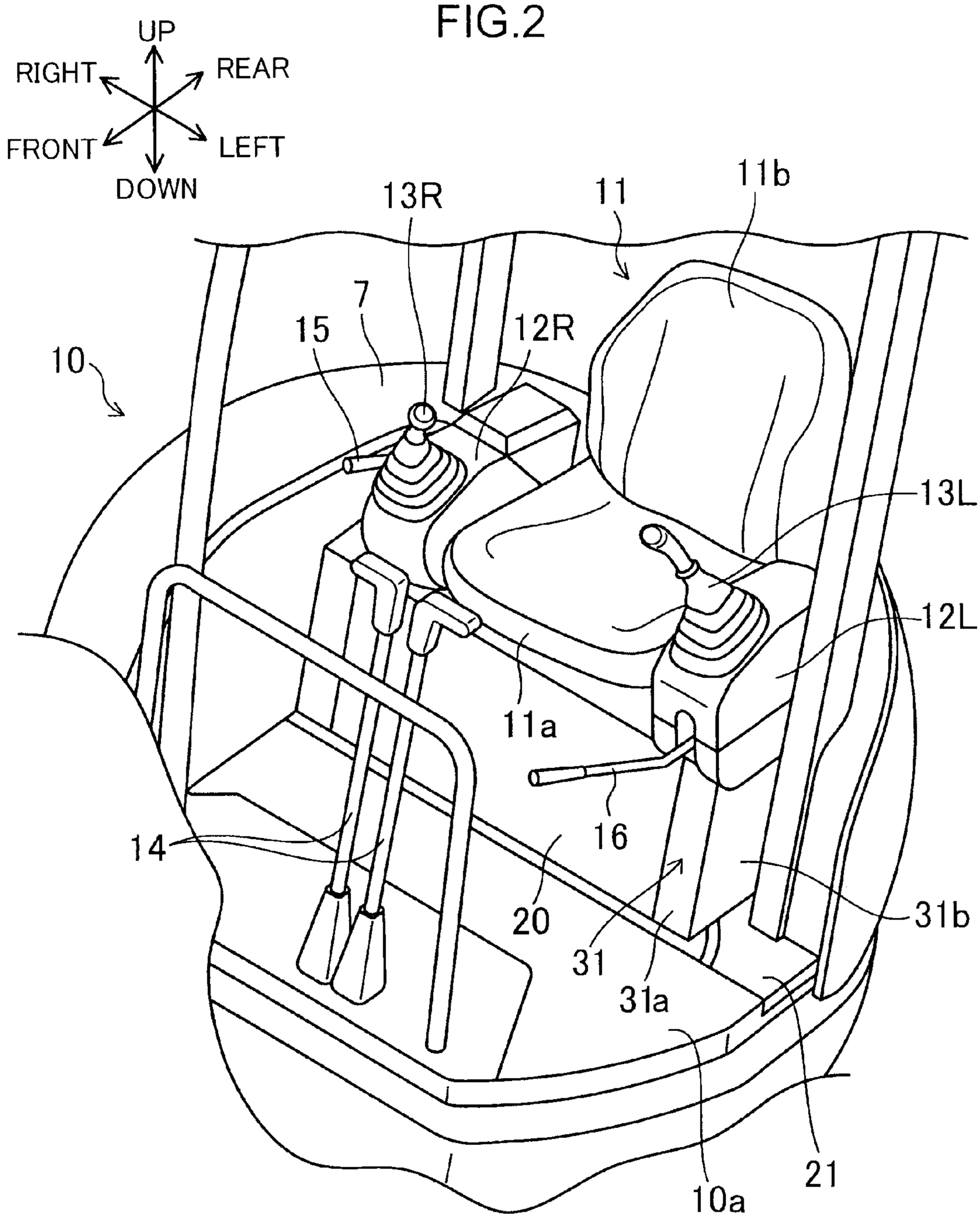
1
3
3b
5
3a
7
2
2a
10
VJ
4
4c
4d
HJ1
4e
HJ3
4b
HJ2
4a
6

FIG.2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RIGHT
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13R
11
11b
7
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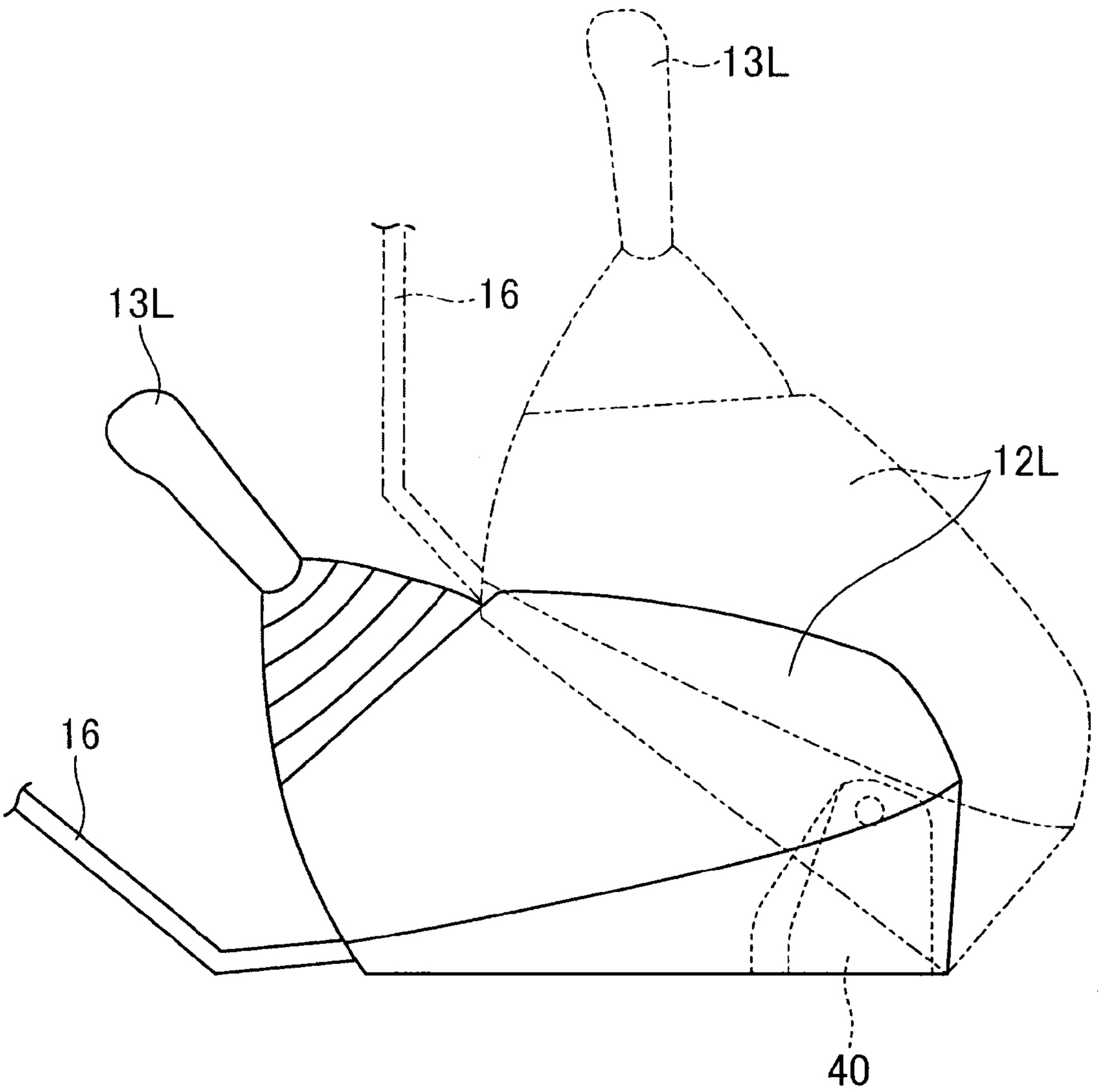
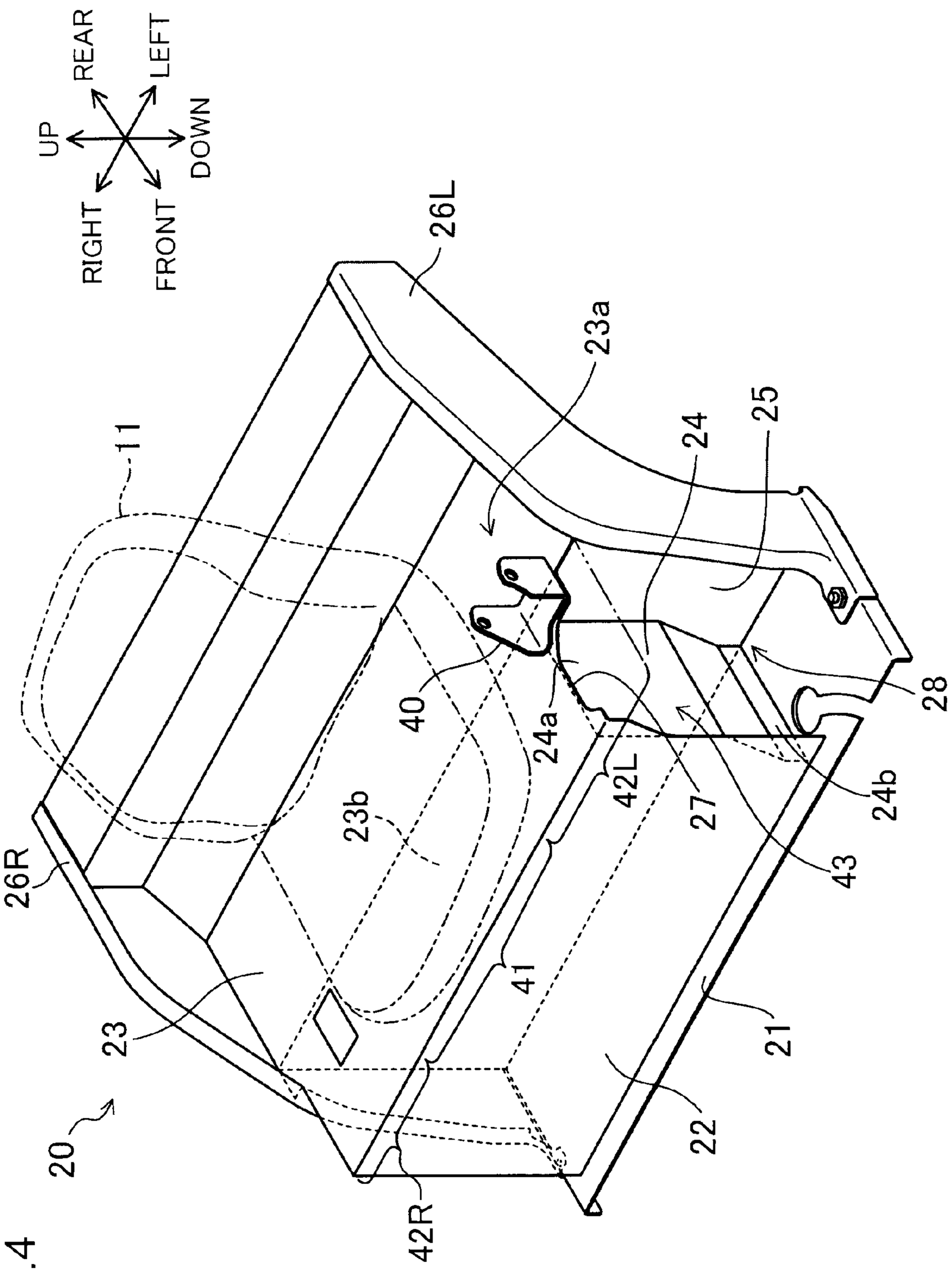
12R
10
13L
12L
11a
16
14
20
31
31b
31a
21
10a

FIG.3

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23a
11
24
25
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24a
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42L
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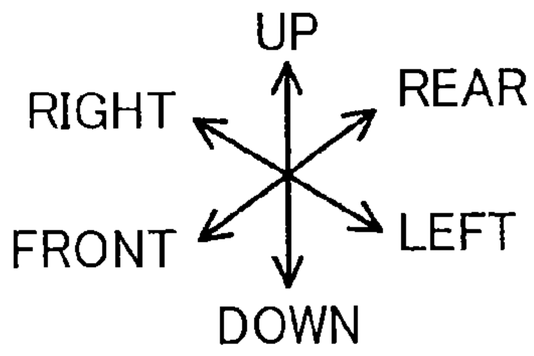
24b
43
23b
26R
41
23
21
20
22
42R

FIG.4

FIG.5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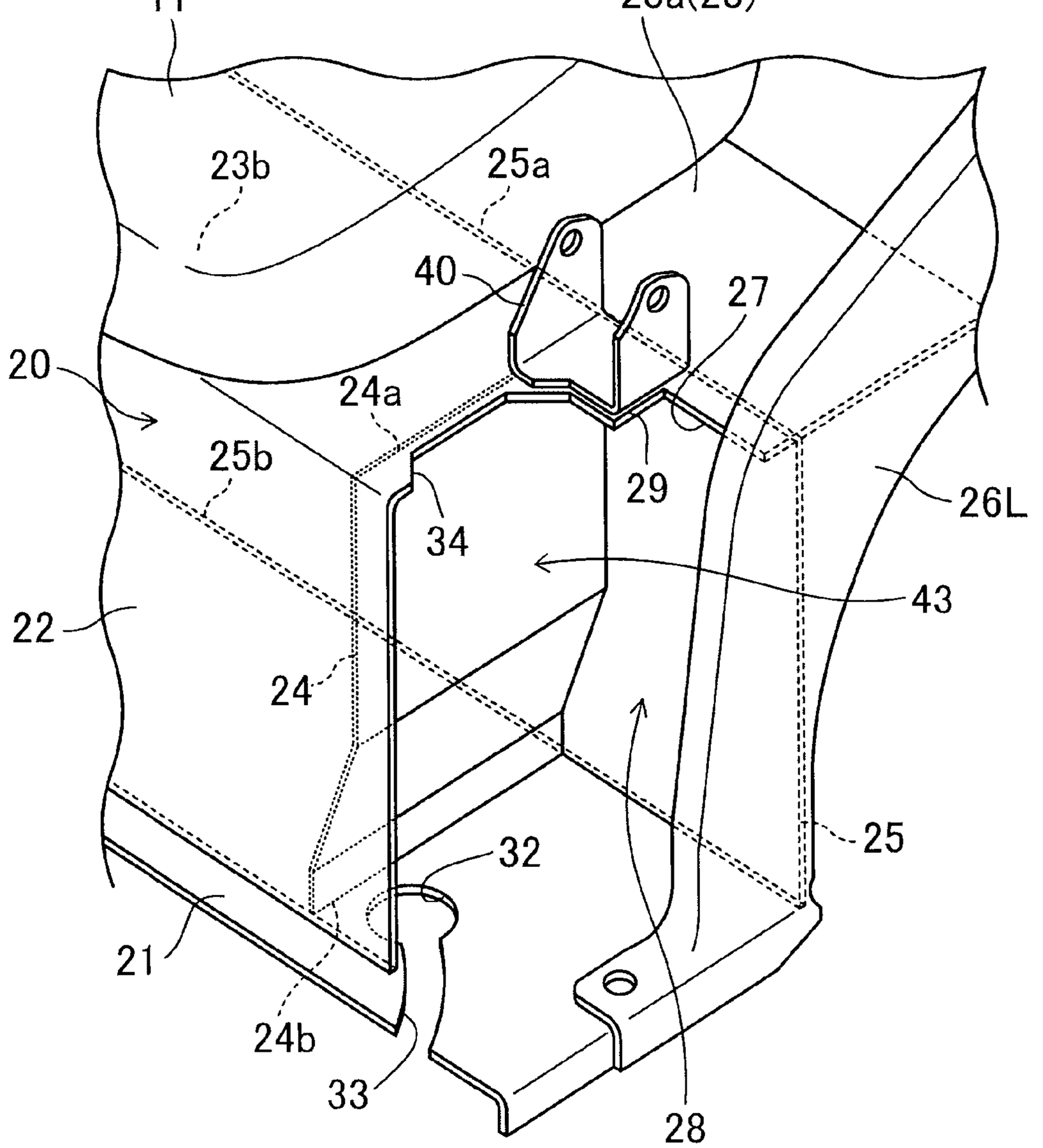
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23a(23)
23b
25a
40
27
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24a
25b
29
26L
34
43
22
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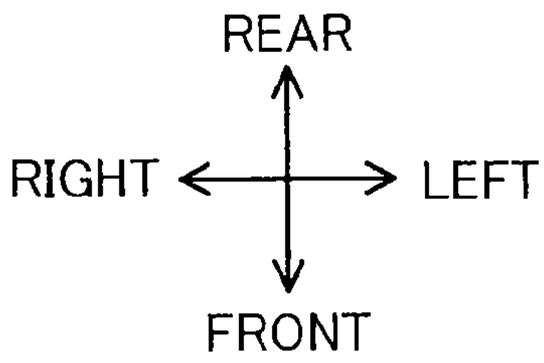
21
24b
33
28

FIG.6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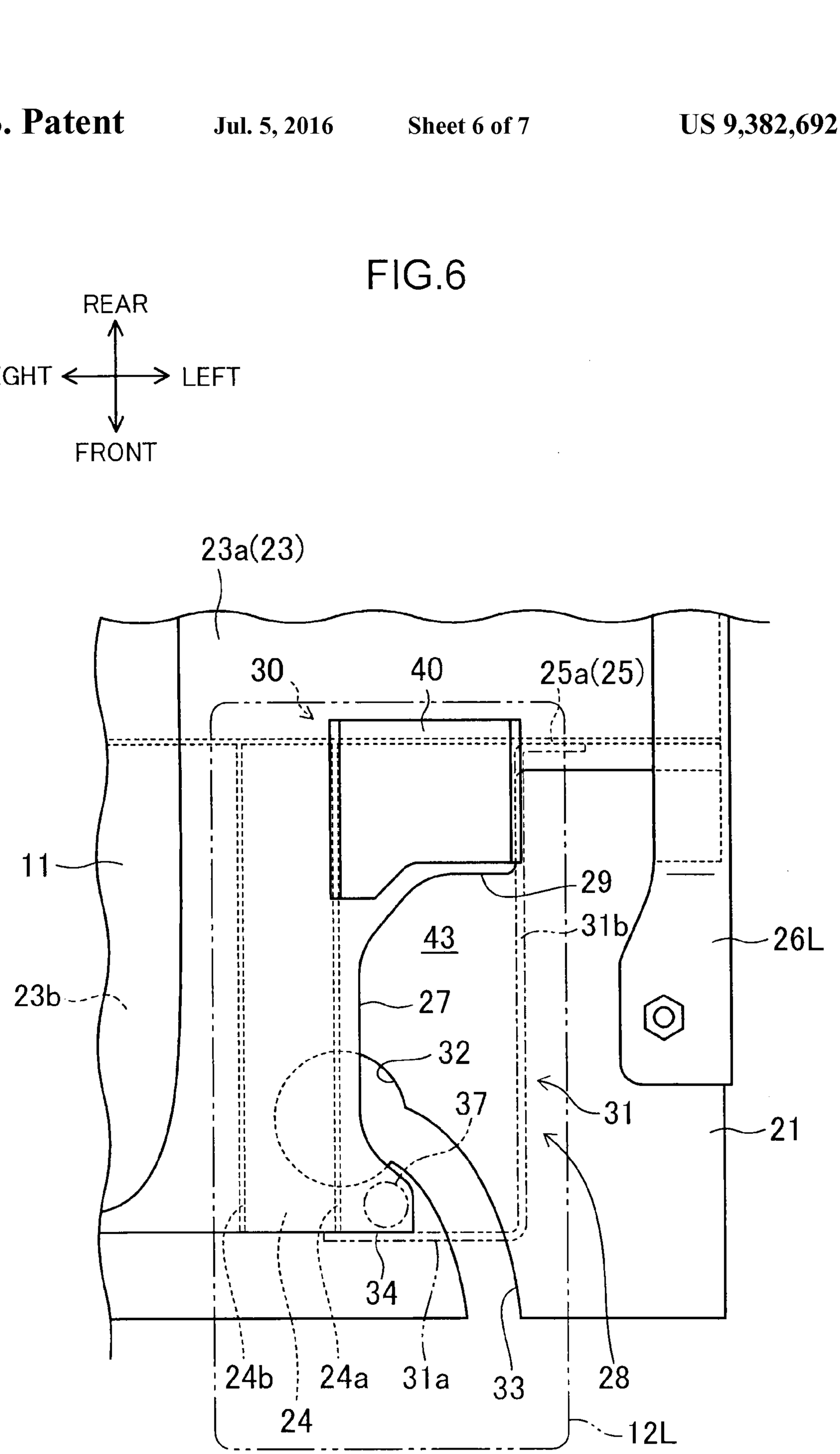
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25a(25)
11
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26L
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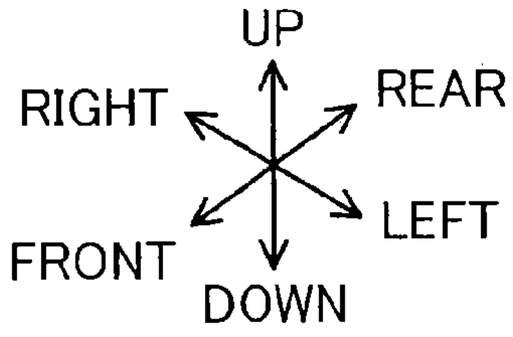
33
28
24
12L

FIG.7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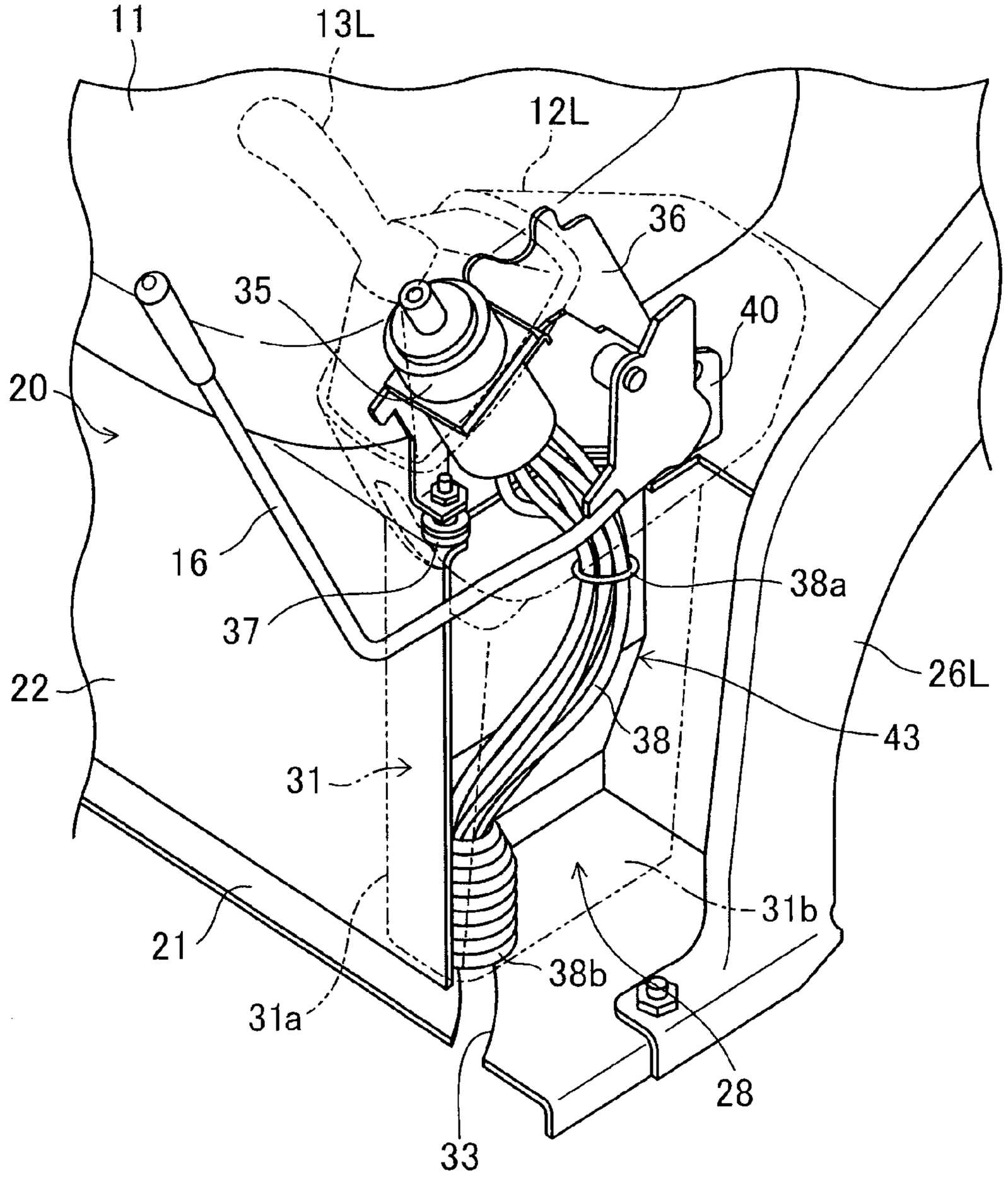
11
13L
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35
40
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38a
22
26L
43
38
31
31b
21
38b
31a
28
33

SEAT STAND AND WORKING MACHINE INCLUDING SAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a working machine such as a hydraulic shovel, and in particular, to a configuration that supports, at the side of a seat, an operating apparatus allowing a working apparatus such as an attachment to be operated.

2. Description of the Related Art

In general, in working machines, for example, an operating lever (operating apparatus) allowing a bucket or the like (working apparatus) to be operated is located at the side of a seat.

For example, a working machine described in Japanese Utility Model Application Laid-open No. H2-70056 (hereinafter it is called patent literature 1) includes a seat, a pair of control boxes in which the control boxes are located at laterally opposite sides of the seat so as to stand from a floor surface, a pair of operating levers (operating apparatuses) in which the operating levers are assembled to the respective control boxes, and a cutoff lever (operating apparatus) assembled to the left control box.

During operation of the working machine, the cutoff lever projects from the left control box toward a loading/unloading passage. On the other hand, in getting on and off the working machine, an operator rotates the cutoff lever and retracts the cutoff lever from the loading/unloading passage. Such rotation of the cutoff lever switches a hydraulic circuit allowing the working apparatus to be driven.

Furthermore, a construction machine described in Japanese Patent Application Laid-open No. 2005-105591 (hereinafter it is called patent literature 2) includes a seat stand allowing an operator's seat (seat) to be supported, a support plate mounted on a side surface of the seat stand, and a control box (operating apparatus) having a rear portion supported by the support plate.

The control box is provided with a loading/unloading cutoff lever and an operating lever.

The control box is supported by the support plate so that the loading/unloading cutoff lever is operationally moved upward to rotate the control box from a working locked position where the control box is substantially horizontally located to an unloading flipped-up position where a front portion of the control box is raised.

In this case, the operating apparatus is connected, via a connection line including at least either hydraulic hose or electric wiring, to a hydraulic apparatus or a control apparatus to allow the working apparatus to be operated.

Furthermore, the operating apparatus faces an operation space, and thus, the esthetic aspect of the operating apparatus is also important.

Thus, a support structure allowing the operating apparatus to be supported needs to have not only a portion that supports the operating apparatus but also an arranging (routing) space through which the connection line is efficiently and appropriately arranged.

In this regard, the working machine described in the patent literature 1 has a arranging space provided in the control box and through which hydraulic piping connected to the operating lever and the cutoff lever is arranged. However, the arranging space is enclosed by the control box, making assembly of both levers to the control box and arranging of the connection line connected to both levers difficult.

Furthermore, the construction machine according to the patent literature 2 allows the control box to be relatively easily assembled to the seat stand by assembling the control box to the support plate.

However, the patent literature 2 fails to disclose the connection line connected to the control box. The constriction machine descried in the patent literature 2 fails to take into account the arranging space through which the connection line is arranged.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a working machine including a seat stand that enables an increase in the efficiency of an assembly operation for an operating apparatus including arranging of a connection line and a working machine including the seat stand.

In order to solve the problem, the present invention provides a seat stand configured to support, at a side of a seat, an operating apparatus causing a working apparatus provided in a working machine to be operated, the seat stand including: a seat support section including an installation plate portion having an upper surface on which the seat is provided; and an operating apparatus support section extending from the seat support section to the side of the seat and configured to support the operating apparatus, wherein the operating apparatus support section has an extension portion extending sideward from the installation plate portion and having an upper surface configured to support the operating apparatus thereon, an arranging space is provided under the extension portion in such a manner that a connection line extending from the operating apparatus supported on the extension portion is arranged through the arranging space, and a cutout portion, formed in the extension portion, penetrates the extension portion in a vertical direction and is open sideward.

Furthermore, the present invention provides a working machine including a working apparatus, an operating apparatus allowing the working apparatus to be operated, and a seat stand supporting the operating apparatus at a side of a seat.

The working machine according to the preset invention enables an increase in the efficiency of an assembly operation for the operating apparatus including arranging of a connection line.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic side view showing a hydraulic shovel according to an embodiment of the present invention;

FIG. **2** is a schematic perspective view showing a configuration provided in an operation space shown in FIG. **1**;

FIG. **3** is a schematic side view illustrating movement of a control box;

FIG. **4** is a schematic perspective view showing a seat stand from which the control box has been removed;

FIG. **5** is a schematic perspective view showing an important part of the seat stand shown in FIG. **4**;

FIG. **6** is a schematic plan view of an important part of the seat stand shown in FIG. **5**; and

FIG. **7** is a schematic perspective view showing an important part of the seat stand to which the control box has been assembled.

DESCRIPTION OF THE EMBODIMENTS

An embodiment of the present invention will be described below with reference to the drawings. The embodiment below

is a specific example of the present invention and is not intended to limit the technical scope of the present invention. Furthermore, unless otherwise specified, the description below uses directions as viewed by an operator sitting in a seat (illustrated directions).

FIG. **1** shows a hydraulic shovel **1** as an example of a working machine according to the present invention. The hydraulic shovel **1** is small in size and is of a rearward small-swing-radius type. Furthermore, the hydraulic shovel **1** includes a lower traveling body **2** of a crawler type and an upper slewing body **3** provided on the lower traveling body **2** so as to able to slew relative to the lower traveling body **2**.

A support frame **3***a* is located at a lower portion of the upper slewing body **3** and has a bottom plate serves as a base and members such as various brackets, a frame, and a plate which are assembled to the bottom plate. The support frame **3***a* is supported so as to be able to slew via a slewing bearing **2***a* relative to the lower traveling body **2**. The support frame **3***a* has an attachment **4** (an example of a working apparatus) provided at a front end portion of the support frame **3***a*.

Specifically, the attachment **4** is supported at a front end of a vertical plate **3***b* standing on the support frame **3***a*.

The attachment **4** includes a swing bracket **4***e* mounted to the vertical plate **3***b* so as to be able to swing around a vertical axis VJ, a boom **4***c* having a base end portion mounted to the swing bracket **4***e* so as to be rotatable around a horizontal axis HJ**1**, an arm **4***b* having a base end portion mounted to the boom **4***c* so as to be rotatable around a horizontal axis HJ**3**, and a bucket **4***a* mounted to the arm **4***b* so as to be rotatable around a horizontal axis HJ**2**. The vertical axis VJ is an axis perpendicular to the ground. The horizontal axes HJ**1** to HJ**3** are axes orthogonal to the vertical axis VJ and parallel to one another.

Furthermore, the attachment **4** includes a plurality of hydraulic cylinders **4***d*. Specifically, the hydraulic cylinders **4***d* include a swing cylinder (not shown in the drawings) allowing the swing bracket **4***e* to swing relative to the support frame **3***a*, a boom cylinder allowing the boom **4***c* to rise and lower relative to the swing bracket **4***e*, an arm cylinder allowing the arm **4***b* to rotate relative to the boom **4***c*, and a bucket cylinder allowing the bucket **4***a* to rotate relative to the arm **4***b*.

The hydraulic shovel **1** allows the attachment **4** to be driven by operating levers **13**R and **13**L. To keep the hydraulic shovel **1** in balance in a front-rear direction with respect to a possible load on the attachment **4**, the upper slewing body **3** includes a heavy counterweight **5** installed at a rear portion of the vertical plate **3***b*.

A dozer **6** (an example of a working apparatus) used for an excavating operation or the like is provided on a front side of the lower traveling body **2**. The dozer **6** is provided on the lower traveling body **2** so as to be able to rise and lower around an axis parallel to the horizontal axes HJ**1** to HJ**3**. In this case, the dozer **6** can also be driven by operating a dozer lever **15** described below.

A machine room **7** is provided in an area ranging from a right portion to a rear portion of the upper slewing body **3**. The machine room **7** houses an engine, a hydraulic apparatus, a fuel tank, a hydraulic oil tank, and the like, none of which is shown in the drawings. An operation space **10** is provided in a front left portion of the upper slewing body **3** (the upper slewing body **3** except for the machine room **7**). The operation space **10** is overlapped from above with a hood. That is, the operation space **10** according to the present embodiment is open sideward.

FIG. **2** shows a configuration provided in the operation space **10**. A seat **11** and operating apparatuses are provided in the operation space **10**. The operating apparatuses includes a pair of traveling levers **14**, a left control box **12**L and a right control box **12**R, a left operating lever **13**L and a right operating lever **13**R, a dozer lever **15**, and a flip-up lever **16**.

The seat **11** has a seat portion **11***a* in which an operator sits, and a backrest portion **11***b* against which the operator's back is pressed. The seat portion **11***a* is mounted on a seat stand **20** described below. The control boxes **12**L and **12**R are located adjacently to the seat **11** on the left and right thereof, respectively, and mounted on the seat stand **20**.

The seat stand **20** is a stand-like frame portion provided in the operation space **10**. The seat stand **20** extends in a lateral direction in a rear portion of the operation space **10**. The seat stand **20** will be described below in detail.

The left and right operating levers **13**L and **13**R are provided in the left and right control boxes **12**L and **12**R, respectively. The attachment **4** can be driven by operating the operating levers **13**L and **13**R.

The flip-up lever **16** is provided in the left control box **12**L.

In this case, a rear end portion (base end portion) of the left control box **12**L is supported by a bracket **40** attached to the seat stand **20** so as to be rotatable between an operating orientation (basic orientation) shown by a solid line in FIG. **3** and a non-operating orientation (stand-up orientation) shown by an imaginary line in FIG. **3**. In the operating orientation, the left control box **12**L is substantially horizontally oriented. On the other hand, in the non-operating orientation, the left control box **12**L is inclined so that a front end portion (leading end portion) of the left control box **12**L lies upward.

With the left control box **12**L placed in the operating orientation, the flip-up lever **16** extends forward from the left control box **12**L so as to block a loading/unloading passage extending leftward from the front of the seat **11**.

In this state, the flip-up lever **16** is operationally moved upward to flip up the left control box **12**L from the operating orientation to the non-operating orientation. In other words, the left control box **12**L rotates so that the front end portion moves upward relative to the operating orientation.

Thus, the flip-up lever **16** is placed in an upper portion of the left control box **12**L to open the loading/unloading passage. Consequently, by rotating the left control box **12**L to the non-operating orientation, the operator can easily enter or exit the operation space **10**.

Furthermore, the hydraulic circuit is switched by operating the flip-up lever **16** so as to rotate the left control box **12**L to the non-operating orientation. For example, the hydraulic circuit is switched so as to inhibit driving of the attachment **4** in spite of operation of the operating levers **13**R and **13**L. For implementation of this function, at least either hydraulic hose or electric wiring is connected to the flip-up lever **16**.

The hydraulic shovel **1** is designed such that the left control box **12**L can be efficiently assembled. A structure allowing the left control box **12**L to be assembled will be described below in detail.

The seat stand **20** is a component assembled to the support frame **3***a*. Specifically, as shown in FIG. **4**, the seat stand **20** includes a bottom plate portion **21**, a front plate portion **22**, a top plate portion **23**, a lower side plate portion **24**, a connected plate portion **25**, and side frame portions **26**L and **26**R, all of which are integrally coupled together. The whole seat stand **20** except for the side frame portions **26**L and **26**R is formed of a steel plate.

The bottom plate portion **21** is formed using a generally rectangular plate member extending in the lateral direction. As shown in FIG. **2**, the bottom plate portion **21** is assembled to the support frame **3***a* behind a floor member **10***a* of the

operation space **10** with a thickness direction of the bottom plate portion **21** extending along the vertical direction.

The front plate portion **22** is formed using a generally rectangular plate member extending in the lateral direction and having a longitudinal dimension smaller than the bottom plate portion **21**. The front plate portion **22** is arranged along a front edge of the bottom plate portion **21**. The front plate portion **22** includes a lower end portion joined to an upper surface of the bottom plate portion **21**. The front plate portion **22** stands from the upper surface of the bottom plate portion **21** with a thickness direction of the front plate portion **22** extending along the front-rear direction (with a front surface of the front plate portion **22** facing the operation space).

The top plate portion **23** is formed using a plate member extending rearward from an upper end portion of the front plate portion **22**. The front plate portion **22** and the top plate portion **23** are formed by folding a single plate member. The top plate portion **23** is arranged substantially parallel to the bottom plate portion **21**. The top plate portion **23** and the bottom plate portion **21** lie opposite each other in the vertical direction. The seat **11** is provided in a laterally intermediate area of an upper surface of the top plate portion **23**.

On the left of the seat **11** and under the top plate portion **23**, the lower side plate portion **24** extends in the front-rear direction. Specifically, the lower side plate portion **24** is located between the front plate portion **22** and the connected plate portion **25** with a thickness direction of the lower side plate portion **24** extending along the lateral direction.

The connected plate portion **25** is arranged under the top plate portion **23** opposite the front plate portion **22** in the front-rear direction and substantially parallel to the front plate portion **22**.

The side frame portions **26**L and **26**R are provided at the left portion and right portion of the seat stand **20**. Furthermore, the side frame portions **26**L and **26**R are each a strength member which has a front end located below a rear end and which is curved so as to protrude upward. Left end portions of the bottom plate portion **21**, top plate portion **23**, and connected plate portion **25** are joined to the left side frame portion **26**L. Right end portions of the bottom plate portion **21**, top plate portion **23**, and crossing plate portion **25** are joined to the right side frame portion **26**R.

In this case, the seat stand **20** is functionally partitioned into a seat support section **41**, a right box support section **42**R, a left box support section **42**L, and a bottom plate portion **21**. The seat support section **41** is a section allowing the seat **11** to be supported. The right box support section **42**R is a section extending from the seat support section **41** to the right side of the seat **11** in order to support the right control box **12**R. The left box support section **42**L is a section extending from the seat support section **41** to the left side of the seat **11** in order to support the left control box **12**L. The bottom plate portion **21** is a portion to which a lower end portion of each of the support sections **41**, **42**R, and **42**L is fixed in order to support the support sections **41**, **42**R, and **42**L from below.

The seat support section **41** includes an installation plate portion **23***b* that is a part of the top plate portion **23** having an upper surface on which the seat **11** is provided and parts of the front plate portion **22** and the connected plate portion **25** which are fixed to the installation plate portion **23***b*.

The right box support section **42**R includes a part of the top plate portion **23** which extends rightward from the installation plate portion **23***b*, parts of the front plate portion **22** and the connected plate portion **25** which extend rightward from the seat **11**, and the right side frame portion **26**R.

As shown in FIG. **5** and FIG. **6**, the left box support section **42**L includes an extension portion **23***a* that is a part of the top plate portion **23** which extends to the left side of the seat **11** from the installation plate portion **23***b*, parts of the front plate portion **22** and the connected plate portion **25** which extend leftward from the seat **11**, the lower side plate portion **24**, and the left side frame portion **26**L. The extension portion **23***a* has an upper surface on which the bracket **40** is provided.

Furthermore, an arranging space **43** is provided under the extension portion **23***a* (inside the left box support section **42**L) in such a manner that a connection line **38** including at least either hydraulic hose or electric wiring extending from the left control box **12**L supported on the extension portion **23***a* is arranged through the arranging space. The arranging space **43** is defined by the lower side plate portion **24**, a part of the extension portion **23***a* located on the left side of the lower side plate portion **24**, a part of the front plate portion **22** located on the left side of the lower side plate portion **24**, a part of the connected plate portion **25** located on the left side of lower side plate portion **24**, and a part of the bottom plate portion **21** located on the left side of the lower side plate portion **24**. In other words, the lower side plate portion **24**, the front plate portion **22**, and the connected plate portion **25** correspond to sidewalls covering the arranging space **43** from the side (right, front, and back) thereof.

Moreover, an opening **28** is formed in the left box support section **42**L so as to make the arranging space **43** open upward and sideward (forward and leftward). The opening **28** includes a cutout portion **27** formed in the extension portion **23***a* and is formed across the extension portion **23***a* and the front plate portion **22**. The cutout portion **27** is a space formed by cutting out a portion of the extension portion **23***a*. The cutout portion **27** penetrates the extension portion **23***a* in the vertical direction and is open sideward (forward and leftward). Furthermore, a left end portion of the front plate portion **22** is cut off over an area ranging from a front end portion of the cutout portion **27** to a lower end portion of the front plate portion **22**. Thus, on the left side of the front plate portion **22** and in front of the connected plate portion **25**, the opening **28** makes the arranging space **43** open forward and leftward. At the cutout portion **27**, the opening **28** makes the arranging space **43** open upward, forward, and leftward.

The cutout portion **27** is a portion formed by cutting out the extension portion **23***a* so as to recess a left end portion of a front edge portion and a front end portion of a left edge portion of the extension portion **23***a* rightward. The cutout portion **27** makes a part of the arranging space **43** open upward, forward, and leftward.

The cutout portion **27** thus formed allows a rear portion of the extension portion **23***a* to project leftward relative to a front portion of the extension portion **23***a*. A left end portion of the rear portion of the extension portion **23***a* is joined to the left side frame portion **26**L. A front left portion of the extension portion **23***a* is positioned forward of the left side frame portion **26**L.

Furthermore, the extension portion **23***a* has a rear adjacent portion **29** located behind and adjacently to the cutout portion **27**. The bracket **40** allowing the left control box **12**L to be supported is attached to an area of the upper surface of the extension portion **23***a* which includes the rear adjacent portion **29**. In other words, the bracket **40** is located behind and adjacently to the cutout portion **27**.

The positional relations between both cutout portion **27** and bracket **40** and both lower side plate portion **24** and connected plate portion **25** will be described below.

The lower side plate portion **24** is located along a right edge of the cutout portion **27** so as to pass through (under) the area to which the bracket **40** is attached (the area in which the left control box **12**L is supported). An upper end portion **24***a* of

the lower side plate portion **24** is joined to a lower surface of the extension portion **23***a*. A lower end portion **24***b* of the lower side plate portion **24** is joined to an upper surface of the bottom plate portion **21**. A front end portion of the lower side plate portion **24** is joined to a rear surface of the front plate portion **22**. A rear end portion of the lower side plate portion **24** is joined to the front surface of the connected plate portion **25**.

Furthermore, the connected plate portion **25** is arranged along a rear edge of the cutout portion **27** so as to pass through the neighborhood of (under) the bracket **40**. An upper end portion **25***a* of the connected plate portion **25** is joined to a lower surface of the top plate portion **23**. A lower end portion **25***b* of the connected plate portion **25** is joined to the upper surface of the bottom plate portion **21**. A left end portion of the connected plate portion **25** is joined to a right surface of the left side frame portion **26**L.

Additionally, the rear end portion of the lower side plate portion **24** is connected to (is in abutting contact with) the intermediate portion of the connected plate portion **25**. Specifically, a position (connected position **30**) where the upper end portion **24***a* of the lower side plate portion **24** is connected to the connected plate portion **25** is located near the bracket **40**. Specifically, the bracket **40** is provided at a position overlapping the connected position **30** in plan view.

As described above, the lower side plate portion **24** and the connected plate portion **25** support the extension portion **23***a* from below. The lower side plate portion **24** and the connected plate portion **25** serve to structurally enhance the strength and rigidity of the left box support section **42**L around the opening **28**. In particular, since the connected position **30** is positioned near (under) the bracket **40**, even when a strong force acts on the bracket **40**, the force can be reliably received by both plate portions **24** and **25**.

Furthermore, the seat stand **20** further includes a side cover **31** removably installed on the left box support section **42**L so as to cover the opening **28** from the side (front and left) thereof. The side cover **31** includes a front plate portion **31***a* extending leftward from the left end portion of the front plate portion **22**, and a left plate portion **31***b* extending rearward from the left end portion of the front plate portion **31***a*. A rear surface of a right end portion of the front plate portion **31***a* is fastened to a front surface of the left end portion of the front plate portion **22**. Additionally, a rear end portion of the left plate portion **31***b* is fastened to the front surface of the connected plate portion **25**.

The side cover **31** is installed on the left box support section **42**L to form a gap between the side cover **31** and the extension portion **23***a* which makes the arranging space **43** open upward as shown in FIG. **6**. As shown in FIG. **6**, the left control box **12**L in the operating orientation (shown by a solid line in FIG. **3**) has a size enough to be able to cover the entire gap in plan view.

A through-hole **32** penetrating the bottom plate portion **21** in the vertical direction is formed in a part of the bottom plate portion **21** which faces the arranging space **43**. The through-hole **32** has a size enough to allow a middle portion of the connection line **38** connected to the left control box **12**L to pass through the through-hole **32**.

Furthermore, the bottom plate portion **21** is provided with a lead-in groove **33** extending sideward from the through-hole **32** and which is open in a front end surface of the bottom plate portion **21**. The lead-in groove **33** has a width dimension enabling the middle portion of the connection line **38** to be inserted into the lead-in groove **33**, and also has a planar shape permitting the connection line **38** to be moved so as to be introduced into the arranging space **43** from the side through the cutout portion **27** (opening **28**). Specifically, the lead-in groove **33** extends leftward from the through-hole **32** and bends backward and is open in the front end surface of the bottom plate portion **21**. The lead-in groove **33** thus formed allows the middle portion of the connection line **38** to be introduced into the through-hole **32** from the front of the bottom plate portion **21** when the connection line **38** is introduced into the arranging space **43** through the through-hole **32**.

The extension portion **23***a* includes a front projection portion (reception section) **34** provided to project to the left at a front end portion of the extension portion **23***a*. The front projection portion **34** is located adjacently to a front side of the cutout portion **27**.

FIG. **7** shows a state where the left control box **12**L has been assembled to the seat stand **20**.

The left control box **12**L is provided with the operating lever **13**L. The left control box **12**L is internally provided with a hydraulic control apparatus **35** actuated by operating the operating lever **13**L and a frame structure **36** that holds the hydraulic control apparatus **35**. A rear end portion (base end portion) of the frame structure **36** is rotatably supported with respect to the bracket **40**. The hydraulic control apparatus **35** is attached to an intermediate portion of the frame structure **36**.

The flip-up lever **16** is also attached to the frame structure **36**. As described above, operation of the flip-up lever **16** allows the left control box **12**L to be flipped up. An elastic abutting contact portion **37** is provided at a lower end of a front end portion of the frame structure **36**.

The abutting contact portion **37** comes into abutting contact with an upper surface of the front projection portion **34** of the extension portion **23***a* when the left control box **12**L rotates from the non-operating orientation to the operating orientation. That is, the front projection portion **34** functions as a stopper that receives the front end portion (leading end portion) of the left control box **12**L, in other words, the abutting contact portion **37**, in order to regulate rotation of the left control box **12**L in the operating orientation.

As described above, the rear end portion of the left control box **12**L is supported by the extension portion **23***a* via the bracket **40**. The intermediate portion of the left control box **12**L in the operating orientation is located over the cutout portion **27** (arranging space **43**). In other words, the left control box **12**L in the operating orientation overlaps the cutout portion **27** in plan view. Furthermore, the front end portion of the left control box **12**L in the operating orientation is supported by the front projection portion **34** of the extension portion **23***a*.

The hydraulic control apparatus **35** is connected with a plurality of connection lines **38** introduced into the operation space **10** from the machine room **7** through the underside of the bottom plate portion **21**. The connection lines **38** move while being deflected in response to operation of the left control box **12**L. Thus, the connection lines **38** need to be loosened so as to be deflected to some degree. Furthermore, the intermediate portion of the connection line **38** is bound together using a binding tool **38***a*. An elastic cover **38***b* covering the periphery of the connection lines **38** is provided over the through-hole **32** in the bottom plate portion **21**.

In this case, when the left control box **12**L is assembled, operations of connecting, adjusting, and binding the connection lines **38**, an operation of installing the elastic cover **38***b*, and the like are also performed. Thus, even when the left control box **12**L is compact, if these operations are difficult to perform, much time and effort is needed, making the operations inefficient.

In contrast, the hydraulic shovel **1** allows an assembly operation for the left control box **12**L and a arranging operation for the connection lines **38** to be easily performed, resulting in more efficient operations.

Now, the assembly operation for the left control box **12**L and the arranging operation for the connection lines **38** will be described.

In the seat stand **20**, the cutout portion **27** (opening **28**) makes the arranging space **43** open forward and leftward. Thus, the connection lines **38** can be introduced into the arranging space **43** from the side thereof through the cutout portion **27** (opening **28**) and easily arranged through the arranging space **43**.

In this case, the cutout portion **27** (opening **28**) makes the arranging space **43** open upward. Thus, the connection lines **38** can be arranged via the cutout portion **27** (opening **28**) in the vertical direction between the arranging space **43** and the left control box **12**L, provided over the arranging space **43**.

Furthermore, the left control box **12**L can be easily assembled to the bracket **40** while the state of the connection lines **38** in the arranging space **43** is being checked from the front and left through the cutout portion **27** (opening **28**).

Then, the connection lines **38** can be easily connected to the hydraulic control apparatus **35** of the left control box **12**L assembled to the bracket **40** through the cutout portion **27** (opening **28**).

Moreover, the connection lines **38** can also be introduced into the through-hole **32** through the lead-in groove **33**. Thus, the middle portions of the connection lines can be inserted into the through-hole **32** after the connection lines **38** are connected to the hydraulic control apparatus **35**.

The opening **28** is finally covered by the side cover **31** from the side of the opening **28** and covered by the left control box **12**L in the operating orientation from above. This prevents the connection lines **38** from being exposed, making the seat stand esthetically appropriate.

Therefore, the seat stand **20** allows the assembly operation for left control box **12**L including arranging of the connection lines **38** to be more efficiently performed without impairing the esthetic aspect of the seat stand **20**.

As described above, the extension portion **23***a* having the upper surface on which the control box **12**L is supported includes the cutout portion **27** penetrating the extension portion **23***a* in the vertical direction and which is open sideward (forward and leftward). Thus, when the control box **12**L is mounted on the extension portion **23***a*, the connection lines **38** extending from the control box **12**L can be introduced into the cutout portion **27** from the side thereof and arranged through the arranging space **43** provided under the extension portion **23***a*.

This eliminates the need for an operation of threading the connection lines **38** through a through-hole first with the leading end side of the connection lines **38** as in a case where the through-hole is formed in the extension portion **23***a* so as to penetrate the extension portion **23***a* in the vertical direction and peripherally enclosed by the extension portion **23***a*.

Furthermore, since the arranging space **43** is open sideward, the left control box **12**L can be mounted on the extension portion **23***a* while the state of the connection lines **38** in the arranging space **43** is being checked from the side of the arranging space **43** through the cutout portion **27**.

On the other hand, a working procedure may be employed in which the connection lines **38** are introduced into the arranging space **43** through the cutout portion **27** and then connected to the left control box **12**L after the left control box **12**L is mounted on the extension portion **23***a*.

Thus, the assembly operation for the left control box **12**L including arranging of the connection lines **38** can be more efficiently performed.

Furthermore, the embodiment can exert the following effects.

According to the embodiment, the bracket **40** allows the left control box **12**L to be mounted on the left control box support section **42**L so as to be rotatable between the operating orientation and the non-operating orientation.

In this case, the left control box **12**L positioned in the operating orientation can overlap the cutout portion **27** from above. Thus, the left control box **12**L can be utilized as a cover for the cutout portion **27**.

According to the embodiment, the front projection portion **34**, which is very simply configured, enables both regulated rotation and stable support of the left control box **12**L. Furthermore, the front projection portion **34** can receive the leading end portion of the left control box **12**L, allowing the left control box **12**L in the operating orientation to be stably supported.

According to the embodiment, the lower side plate portion **24** serves to structurally enhance the strength and rigidity of the left control box support section **42**L, allowing the left control box **12**L to be more stably supported.

According to the embodiment, the weight of the left control box **12**L can be reliably received by the lower side plate portion **24**, allowing the left control box **12**L to be more stably supported.

According to the embodiment, the connected plate portion **25** serves to structurally further increase the strength and rigidity of the left box support section **42**L, allowing the left control box **12**L to be further stably supported.

According to the embodiment, while the lower side plate portion **24** and the connected plate portion **25**, which are connected each other, serve to structurally enhance the strength and rigidity of the left box support section **42**L, the support position (bracket **40**) for the left control box **12**L is provided at the position overlapping the connected position **30** where the connected plate portion **25** and the lower side plate portion **24** cross each other.

Thus, the weight of the left control box **12**L can be reliably received by the strength-enhanced portion of the left box support section **42**L, allowing the left control box **12**L to be more stably supported.

According to the embodiment, while the sidewall (the lower side plate portion **24**, the front plate portion **22**, and the connected plate portion **25**) covers the arranging space **43** from the side thereof to improve the esthetic aspect of the seat stand, the opening **28** makes the arranging space **43** open upward and sideward (forward and leftward) to keep the assembly operation for the left control box **12**L efficient.

According to the embodiment, the side cover **31** is mounted to the left box support section **42**L after the left control box **12**L is mounted on the extension portion **23***a* with the connection lines **38** arranged through the arranging space **43**. This allows the connection lines **38** in the arranging space **43** to be covered from the side of the connection lines **38**.

This enables improvement of the esthetic aspect of the seat stand **20** after mounting of the left control box **12**L.

According to the embodiment, with the left control box **12**L mounted on the extension portion **23***a*, the side cover **31** can cover the opening **28** from the side thereof, and the left control box **12**L in the operating orientation can cover the gap (the portion through which the arranging space **43** is open upward) between the side cover **31** and the extension portion **23***a* from above.

This enables the arranging space **43** to be blocked from above and from the side of the arranging space **43**, allowing further improvement of the esthetic aspect of the seat stand after mounting of the left control box **12**L.

According to the embodiment, the seat support section **41** and the left box support section **42**L are provided on the bottom plate portion **21**. Thus, both support sections **41** and **42**L can be assembled to the hydraulic shovel **1** at a time by mounting the bottom plate portion **21** on the support frame **3***a* of the hydraulic shovel **1**.

According to the embodiment, the through-hole **32** is formed in the bottom plate portion **21** so as to allow the middle portions of the connection lines **38** to pass through the through-hole **32** in the vertical direction. Thus, the connection lines **38** extending upward from the underside of the bottom plate portion **21** can be arranged while penetrating the bottom plate portion **21** through the through-hole **32**.

According to the embodiment, by inserting the middle portions of the connection lines **38** into the lead-in groove **33** from the side of the bottom plate portion **21** and moving the middle portions through the lead-in groove **33**, the connection lines **38** can be guided into the through-hole **32** through the lead-in groove **33** without the need to pre-insert the leading end portions of the connection lines **38** into the through-hole **32**.

This allows adoption of, for example, a working procedure in which the connection lines **38** are introduced into the through-hole **32** after the leading end portions of the connection lines **38** are attached to the left control box **12**L.

The working machine according to the present invention is not limited to the embodiment but includes various other configurations.

For example, the form of the operation space described above is illustrative, and an operation space peripherally enclosed by a wall of a cab can be adopted.

The through-hole **32** and the lead-in groove **33**, through which the connection lines **38** are introduced into the arranging space **43**, may be formed in the connected plate portion **25** or the lower side plate portion **24** rather than in the bottom plate portion **21**.

Furthermore, the lead-in groove **33** may be omitted.

The extension portion **23***a*, a part of the top plate portion **23**, has been described. However, the extension portion **23***a* may be formed using a member different from the top plate portion **23**.

The left control box **12**L has been illustrated as an operating apparatus. However, the operating lever **13**L and **13**R, the dozer lever **15**, the flip-up lever **16**, and the like may be adopted as an operating apparatus.

In this case, an operating apparatus support section may be adopted which allows the operating lever **13**L and **13**R, the dozer lever **15**, the flip-up lever **16**, and the like to be supported at the side of the seat **11** with no use of the control box.

The specific embodiment described above mainly includes inventions having the following configurations.

In order to solve the problem, the present invention provides a seat stand configured to support, at a side of a seat, an operating apparatus causing a working apparatus provided in a working machine to be operated, the seat stand including a seat support section having an installation plate portion including an upper surface on which the seat is provided and an operating apparatus support section extending from the seat support section to the side of the seat and configured to support the operating apparatus, wherein the operating apparatus support section has an extension portion extending sideward from the installation plate portion and having an upper surface configured to support the operating apparatus thereon, an arranging space is provided under the extension portion in such a manner that a connection line extending from the operating apparatus supported on the extension portion is arranged through the arranging space, and a cutout portion, formed in the extension portion, penetrates the extension portion in a vertical direction, and is open sideward.

According to the present invention, the extension portion having the upper surface allowing the operating apparatus to be supported includes the cutout portion penetrating the extension portion in the vertical direction and which is open sideward. Thus, when the operating apparatus is mounted on the extension portion, the connection line extending from the operating apparatus can be introduced into the cutout portion from the side thereof and arranged through the arranging space provided under the extension portion.

This eliminates the need for an operation of threading the connection line through a through-hole first with the leading end side of the connection line as in a case where the through-hole is formed in the extension portion so as to penetrate the extension portion in the vertical direction and peripherally enclosed by the extension portion.

Furthermore, since the arranging space is open sideward, the operating apparatus can be mounted on the extension portion while the state of the connection line in the arranging space is being checked from the side of the arranging space through the cutout portion.

On the other hand, a working procedure may be employed in which the connection line is introduced into the arranging space through the cutout portion and then connected to the operating apparatus after the operating apparatus is mounted on the extension portion.

Thus, according to the present invention the assembly operation for the operating apparatus including arranging of the connection line can be more efficiently performed.

In the present invention, the connection line includes at least either hydraulic hose or electric wiring.

In the present invention, the cutout portion is a space formed by cutting out a portion of the extension portion.

In the seat stand, the extension portion is preferably provided with a bracket configured to support a base end portion of the operating apparatus in such a manner that the operating apparatus is rotatable between a basic orientation in which the operating apparatus overlaps the cutout portion from above and a stand-up orientation in which a leading end portion of the operating apparatus is moved upward relative to the basic orientation.

According to this aspect, the bracket allows the operating apparatus to be mounted on an operating apparatus support section so as to be rotatable between the basic orientation and the stand-up orientation.

In this case, the operating apparatus positioned in the basic orientation can overlap the cutout portion. Thus, when a relatively large control box is adopted, the control box can be utilized as a cover for the cutout portion.

In the seat stand, the extension portion preferably includes a reception section receiving the leading end portion of the operating apparatus positioned in the basic orientation in order to regulate rotation of the operating apparatus in the basic orientation.

According to this aspect, the reception section, which is very simply configured, enables both regulated rotation and stable support of the operating apparatus. Specifically, the reception section receives the leading end portion of the operating apparatus, allowing the operating apparatus in the operating orientation to be reliably supported.

In the seat stand, the operating apparatus support section preferably further has a lower side plate portion connected to

a lower surface of the extension portion in order to support the extension portion from below.

According to this aspect, the lower side plate portion serves to structurally enhance the strength and rigidity of the operating apparatus support section, allowing the operating apparatus to be more stably supported.

In the seat stand, a support position on the extension portion where the operating apparatus is supported is preferably set at a position overlapping the lower side plate portion in plan view.

According to this aspect, the weight of the operating apparatus can be reliably received by the lower side plate portion, allowing the operating apparatus to be more stably supported.

In the seat stand, the operating apparatus support section preferably further has a connected plate portion connected to the lower surface of the extension portion in order to support the extension portion from below, extending along a direction crossing the lower side plate portion in plan view, and connected to the lower side plate portion.

According to this aspect, the connected plate portion serves to structurally further increase the strength and rigidity of the operating apparatus support section, allowing the operating apparatus to be further stably supported.

Furthermore, when the support position on the extension portion where the operating apparatus is supported is set at the position overlapping the lower side plate portion in plan view, preferably the operating apparatus support section further has a connected plate portion connected to the lower surface of the extension portion in order to support the extension portion from below, extending along a direction crossing the lower side plate portion in plan view, and connected to the lower side plate portion, and the support position on the extension portion where the operating apparatus is supported is provided at a position overlapping a connected position where the lower side plate portion and the connected plate portion are connected each other in plan view.

According to this aspect, while the lower side plate portion and the connected plate portion, which extend along directions crossing each other, serve to structurally enhance the strength and rigidity of the operating apparatus support section, the support position for the operating apparatus is provided at the position overlapping the connected position where the connected plate portion and the lower side plate portion are connected each other.

Thus, the weight of the operating apparatus can be reliably received by the strength-enhanced portion of the operating apparatus support section, allowing the operating apparatus to be more stably supported.

In the seat stand, preferably the operating apparatus support section further includes a sidewall covering the arranging space from a side of the arranging space and has an opening formed across the extension portion and the sidewall, the opening including the cutout portion and making the arranging space open upward and sideward.

According to this aspect, while the sidewall covers the arranging space from the side thereof to improve the esthetic aspect of the seat stand, the opening makes the arranging space open upward and sideward so that the assembly operation for the operating apparatus can be kept efficient.

The seat stand preferably further includes a side cover that is able to be mounted to the operating apparatus support section so as to cover the opening from a side of the opening.

According to this aspect, the connection line in the arranging space can be covered from the side of the connection line by mounting the side cover to the operating apparatus support section after the operating apparatus is mounted on the extension portion with the connection line arranged through the arranging space.

This improves the esthetic aspect of the support structure after mounting of the operating apparatus.

In the seat stand, the extension portion is provided with a bracket configured to support a base end portion of the operating apparatus in such a manner that the operating apparatus is rotatable between a basic orientation in which the operating apparatus overlaps the cutout portion from above and a stand-up orientation in which a leading end portion of the operating apparatus is moved upward relative to the basic orientation, the operating apparatus support section further includes a sidewall covering the arranging space from a side of the arranging space and has an opening formed across the extension portion and the sidewall, the opening including the cutout portion and making the arranging space open upward and sideward, the seat stand further includes a side cover that is able to be mounted to the operating apparatus support section so as to cover the opening from a side of the opening, and the operating apparatus in the basic orientation has a size enough to be able to entirely cover a gap between the side cover and the extension portion in plan view.

According to this aspect, with the operating apparatus mounted on the extension portion, the opening is covered by the side cover from the side of the opening, and the gap between the side cover and the extension portion (the portion making the arranging space open upward) can be covered by the operating apparatus in the basic orientation from above.

Thus, the arranging space can be blocked from above and from the side of the arranging space, allowing the esthetic aspect of the seat stand to be further improved after muting of the operating apparatus.

Preferably, the seat stand further includes a bottom plate portion to which lower end portions of the seat support section and the operating apparatus support section are fixed, and a through-hole is formed in the bottom plate portion so as to allow a middle portion of the connection line to pass through the through hole in the vertical direction.

According to this aspect, since the seat support section and the operating apparatus support section are provided on the bottom plate portion, both support sections can be assembled to the working machine at a time by mounting the bottom plate portion to a frame of the working machine.

In this case, the connection line may be arranged to the side of the seat through a space under the bottom plate portion.

Thus, according to this aspect, a through-hole is formed in the bottom plate portion so as to allow the middle portion of the connection line to pass through the through-hole in the vertical direction.

This allows the connection line extending upward from the underside of the bottom plate portion to be arranged while penetrating the bottom plate portion through the through-hole.

In the seat stand, preferably, the bottom plate portion is provided with a lead-in groove extending sideward from the through-hole and which is open in a side end surface of the bottom plate portion, and the lead-in groove has a width dimension enabling the middle portion of the connection line to be inserted into the lead-in groove, and also has a planar shape permitting the connection line to be moved so as to be introduced into the arranging space from the side.

According to this aspect, by inserting the middle portion of the connection lines into the lead-in groove from the side of the bottom plate portion and moving the middle portion through the lead-in groove, the connection line can be guided

into the through-hole through the lead-in groove without the need to pre-insert the leading end portion of the connection line into the through-hole.

This allows adoption of, for example, a working procedure in which the connection line is introduced into the through-hole after the leading end portion of the connection line is connected to the working apparatus. As a result, the operation can be more efficiently performed.

Furthermore, the present invention provides a working machine including a working apparatus, an operating apparatus allowing the working apparatus to be operated, and a seat stand supporting the operating apparatus at a side of a seat.

This application is based on Japanese Patent application No. 2013-124383 filed in Japan Patent Office on Jun. 13, 2013, the contents of which are hereby incorporated by reference.

Although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be understood that various changes and modifications will be apparent to those skilled in the art. Therefore, unless otherwise such changes and modifications depart from the scope of the present invention hereinafter defined, they should be construed as being included therein.

The invention claimed is:

1. A seat stand configured to support, at a side of a seat, an operating apparatus causing a working apparatus provided in a working machine to be operated, the seat stand comprising:

a seat support section having an installation plate portion including an upper surface on which the seat is provided; and

an operating apparatus support section extending from the seat support section to the side of the seat and configured to support the operating apparatus, wherein

the operating apparatus support section has an extension portion extending sideward from the installation plate portion and having an upper surface configured to the operating apparatus thereon,

an arranging space is provided under the extension portion in such a manner that a connection line extending from the operating apparatus supported on the extension portion is arranged through the arranging space,

a cutout portion, formed in the extension portion, penetrates the extension portion in a vertical direction and is open sideward, and

the extension portion is provided with a bracket configured to support a base end portion of the operating apparatus such that the operating apparatus is rotatable between a basic orientation in which the operating apparatus overlaps the cutout portion from above and a stand-up orientation in which a leading end portion of the operating apparatus is moved upward relative to the basic orientation.

2. The seat stand according to claim **1**, wherein the extension portion comprises a reception section receiving the leading end portion of the operating apparatus positioned in the basic orientation in order to regulate rotation of the operating apparatus in the basic orientation.

3. The seat stand according to claim **1**, wherein the operating apparatus support section further comprises a lower side plate portion connected to a lower surface of the extension portion in order to support the extension portion from below.

4. The seat stand according to claim **3**, wherein the operating apparatus support section further comprises a connected plate portion connected to the lower surface of the extension portion in order to support the extension portion from below, extending along a direction crossing the lower side plate portion in plan view, and connected to the lower side plate portion.

5. The seat stand according to claim **1**, wherein

the operating apparatus support section further includes a sidewall covering the arranging space from a side of the arranging space, and

the operating apparatus support section has an opening formed across the extension portion and the sidewall, the opening including the cutout portion and making the arranging space open upward and sideward.

6. The seat stand according to claim **1**, wherein

the operating apparatus support section further has a sidewall covering the arranging space from a side of the arranging space,

the operating apparatus support section has an opening formed across the extension portion and the sidewall, the opening including the cutout portion and making the arranging space open upward and sideward,

the seat stand further has a side cover that is able to be mounted to the operating apparatus support section so as to cover the opening from a side of the opening, and

the operating apparatus in the basic orientation has a size large enough to be able to entirely cover a gap between the side cover and the extension portion in plan view.

7. A working machine comprising:

a working apparatus;

an operating apparatus for operating the working apparatus; and

a seat stand supporting the operating apparatus at a side of a seat according to claim **1**.

8. A seat stand configured to support, at a side of a seat, an operating apparatus causing a working apparatus provided in a working machine to be operated, the seat stand comprising:

a seat support section having an installation plate portion including an upper surface on which the seat is provided; and

an operating apparatus support section extending from the seat support section to the side of the seat and configured to support the operating apparatus, wherein

the operating apparatus support section has an extension portion extending sideward from the installation plate portion and having an upper surface configured to support the operating apparatus thereon,

an arranging space is provided under the extension portion in such a manner that a connection line extending from the operating apparatus supported on the extension portion is arranged through the arranging space, and

a cutout portion, formed in the extension portion, penetrates the extension portion in a vertical direction and is open sideward,

the operating apparatus support section further comprises a lower side plate portion connected to a lower surface of the extension portion in order to support the extension portion from below, and

a support position on the extension portion where the operating apparatus is supported is set at a position overlapping the lower side plate portion in plan view.

9. The seat stand according to claim **8**, wherein

the operating apparatus support section further comprises a connected plate portion connected to the lower surface of the extension portion in order to support the extension portion from below, extending along a direction crossing the lower side plate portion in plan view, and connected to the lower side plate portion, and

the support position on the extension portion where the operating apparatus is supported is provided at a posi-

tion overlapping a connected position where the lower side plate portion and the connected plate portion are connected each other in plan view.

10. A seat stand configured to support, at a side of a seat, an operating apparatus causing a working apparatus provided in a working machine to be operated, the seat stand comprising:

a seat support section having an installation plate portion including an upper surface on which the seat is provided; and

an operating apparatus support section extending from the seat support section to the side of the seat and configured to support the operating apparatus, wherein

the operating apparatus support section has an extension portion extending sideward from the installation plate portion and having an upper surface configured to support the operating apparatus thereon,

an arranging space is provided under the extension portion in such a manner that a connection line extending from the operating apparatus supported on the extension portion is arranged through the arranging space,

a cutout portion, formed in the extension portion, penetrates the extension portion in a vertical direction and is open sideward,

the operating apparatus support section further includes a sidewall covering the arranging space from a side of the arranging space, and an opening formed across the extension portion and the sidewall, the opening including the cutout portion and making the arranging space open upward and sideward, and

the seat stand further comprises a side cover that is able to be mounted to the operating apparatus support section so as to cover the opening from a side of the opening.

11. A seat stand configured to support, at a side of a seat, an operating apparatus causing a working apparatus provided in a working machine to be operated, the seat stand comprising:

a seat support section having an installation plate portion including an upper surface on which the seat is provided; and

an operating apparatus support section extending from the seat support section to the side of the seat and configured to support the operating apparatus, wherein

the operating apparatus support section has an extension portion extending sideward from the installation plate portion and having an upper surface configured to support the operating apparatus thereon,

an arranging space is provided under the extension portion in such a manner that a connection line extending from the operating apparatus supported on the extension portion is arranged through the arranging space,

a cutout portion, formed in the extension portion, penetrates the extension portion in a vertical direction and is open sideward,

the seat stand further comprises a bottom plate portion to which lower end portions of the seat support section and the operating apparatus support section are fixed, and

a through-hole is formed in the bottom plate portion so as to allow a middle portion of the connection line to pass through the through hole in a vertical direction.

12. The seat stand according to claim **11**, wherein

the bottom plate portion is provided with a lead-in groove which extends sideward from the through-hole and which is open in a side end surface of the bottom plate portion, and

the lead-in groove has a width dimension enabling the middle portion of the connection line to be inserted into the lead-in groove, and also has a planar shape permitting the connection line to be moved so as to be introduced into the arranging space from the side.

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